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the occurrence of *Gasterosteus williamsoni* in an artesian well at San Bernardino, California.——Messrs. Evermann and Meek (Proceedings Academy Natural Sciences, Philadelphia, 1883), define sixteen species of Gerres, and review the species found in American waters. *G. homonymus* is considered identical with *G. gula* C. and V. and *G. harengulus* with *Eucinostomus pseudogula* of Poey and *Diapterus gracilis* of Gill.

Birds.—Dr. R.W. Shufeldt publishes in the Journal of Physiology and Anatomy (XVIII, 86), observations on the osteology of *Podasocys montanus*, illustrated by a plate. In 1859 the skins of but two of these birds were in the Smithsonian collections. Upon its native plains, and in the open parks of the Rocky mountains, it has all the habits and action of a true plover, lacking only in the noisy traits of Vanellas and Ægialites.——The Bulletin of the Nuttall Ornithological Club for October, 1883, contains a notice by Dr. C. H. Merriam, of the yellow-green vireo, which has not before occurred north of Fort Brown, Texas. It was found dead in the Province of Quebec, Canada, and was probably a storm waif. Dr. Merriam also states that the harlequin duck, a common summer resident in Newfoundland, nests in hollow trees. His authority is James P. Honley, of the Newfoundland Geological Survey, who writes: "It is quite true the birds nest in hollow stumps of trees, usually on islets in the lakes or tarns of the interior. They usually frequent the larger lakes and rivers far from the seacoast, but are found scattered all over the country."——W. Brewster notices an apparently new gull from Northeastern America, which Kumlien regarded as *Larus glaucescens*, but which Brewster renames *Larus kumlieni*.——The nest and young of the pigmy owl at Fort Klamath, California, are described by C. F. Bendire.

Mammals.—Dr. J. B. Holder, of the American Museum of Natural History, New York, has added further to our knowledge of the right whale of the north temperate Atlantic (*Balæna cisartica* Cope) by the publication of figures and descriptions of the exterior characters and osteology of three or four examples, including both sexes. The head is always relatively shorter than in *B. mysticetus*, but a female from the New Jersey coast has a longer head than the males. Dr. Manigault, in a letter to Dr. Holder respecting an example taken at Charleston, South Carolina, states that a fishery for this whale is carried on to a limited extent off the coast of South Carolina and Georgia, and that it attains a length of sixty feet.

PHYSIOLOGY.[1]

DIGESTION WITHOUT A STOMACH.—In the *Archiv f. Anatomie u. Physiologie*, 1883, M. Ogata describes some remarkable experiments upon the digestive powers of animals in which the influence

[1] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.

of the stomach was nearly or completely excluded. A dog was submitted to an operation in which the whole of the stomach was removed except a small part of the wall near the cardiac entrance of the organ. The free edges of the alimentary tube were sewed together, the animal completely recovered from the operation and was killed six years after for the purpose of post mortem observation. During that period the dog remained in perfect health, gained in weight and readily digested the most various food matters. The fœces were quite normal in character. Ogata studied the subject farther in various ways. In dogs possessing a gastric fistula food matters of different kinds were introduced, by means of a tube passed through the opening in the stomach wall, directly into the duodenum, the gastric juice being prevented from passing the pylorus by means of an appropriate plug. When mixed tissues, such as pieces of liver, lung or intestinal mucous membrane were thus introduced into the duodenum, it was found that the cellular or albumen-containing elements were most readily dissolved, while the collaginous and reticular tissues were comparatively unaffected. Elastic tissue was also dissolved, but more slowly than the first-named. With vegetable substances it was found that the cell contents were dissolved while the cell-walls, though apparently offering no great resistance to the diffusion of the intestinal juices through them, remained undigested. A number of dogs were fed in the way described with meat or eggs and killed in a painless manner at different times after giving the meal. It was found that the food in each case had provoked active secretion of the alkaline fluids of the pancreas and intestine and that a large amount of material was digested and absorbed within two hours after feeding. The conclusion arrived at is that albuminous bodies and cooked connective tissue are digested as thoroughly and speedily by juices poured into the intestine alone as by the secretions of the stomach and intestine together. In these digestions there seemed to be a very limited flow of bile. Comparative experiments showed that albuminous substances were digested much more completely and speedily in the intestine alone than in the stomach alone, and such food matters were digested more rapidly when brought directly into the intestine than when taken in the natural manner by the mouth.

Measurements of the Depth of Sleep.—Two of Vierordt's pupils have made the depth of sleep the subject of an investigation. They worked upon the principle that the depth of sleep is proportional to the strength of the sensory stimulus necessary to awaken the sleeper, that is, to call forth some decisive sign of awakened consciousness. As a sensory stimulus they made use of the auditory sensation produced by dropping a lead ball from a given height. The strength of the stimulus was reckoned, in accordance with some recent investigations of Vierordt, as increasing, not directly as the height, but as the 0.59 power of the

height. For a perfectly healthy man, the curve which they give shows that for the first hour the slumber is very light; after one hour and and fifteen minutes, the depth of sleep increases rapidly, and reaches its maximum point at one hour and forty-five minutes; the curve then falls quickly to about two hours and fifteen minutes, and afterwards more gradually. At about four hours and thirty minutes, there is a second small rise which reaches its maximum at five hours and thirty minutes, after which the curve again gradually approaches the base line until the time of awakening.

Experiments made upon persons not perfectly healthy, or after having made some exertion, gave curves of a different form.—*Science.*

EXPERIMENTS UPON THE HEART OF THE DOG WITH REFERENCE TO THE MAXIMUM VOLUME OF BLOOD SENT OUT BY THE LEFT VENTRICLE IN A SINGLE BEAT, AND THE INFLUENCE OF VARIATIONS IN VENOUS PRESSURE, ARTERIAL PRESSURE, AND PULSE-RATE UPON THE WORK DONE BY THE HEART. By W. H. Howell and F. Donaldson, Jr.[1]—Owing to the indirectness of the methods hitherto used for estimating the quantity of blood pumped out from the left ventricle at each systole, this important factor in all calculations of the work done by the heart has never been satisfactorily determined. Volkmann, and afterwards Vierordt, from calculations based upon the mean velocity of the stream of blood in the unbranched aorta, obtained the fraction $\frac{1}{400}$ as representing the ratio between the weight of blood thrown out at each systole and the body-weight. Fick, from data obtained by placing the arm in a plethymograph, arrived at a much smaller fraction, $\frac{1}{1000}$. In our investigation we have made use of the dog's heart, completely isolated from all other organs of the body, with the exception of the lungs, after the method devised by Professor Martin. By this method it is possible to estimate directly the quantity of blood ejected from the left ventricle at each systole.

With regard to the maximum quantity of blood which can be thrown out from the left ventricle at a single systole, the general result of the experiments may be stated as follows: With a mean pulse-rate of 180 per minute, the mean rate of the maximum weight of blood pumped out from the left ventricle at each systole to the body weight is $\frac{1}{855}$ or .0017. In one experiment in which the pulse-rate was 126 per minute, about the normal rate, the ratio obtained was $\frac{1}{700}$ or .0014. In applying these results to the normal dog, we believe that the average quantity of blood pumped out from the left ventricle at each systole in the living dog, is approximated most closely in the experiments given by the maximum outflow obtained from the isolated heart.

Variations of arterial pressure, from 58 to 147 millims. of mer-

[1] Abstract reprinted from the Proceedings of the Royal Society of London, No. 226, 1883.

cury, were found to have no direct effect whatever upon the quantity of blood sent out from the left ventricle at each systole. Since the pulse rate is not altered, the work done by the left ventricle varies directly as the arterial pressure against which it works, within the limits named. For how much wider limits than those given this may hold true was not determined. There is every reason to believe that under normal conditions the force of the systole is more than sufficient to completely empty the ventricular cavity, and since, with arterial pressures from 58 to 147 millims., the quantity of blood ejected at each systole remains constant, it seems probable that within these limits, at least, the force of the ventricular contraction is not influenced by variations in arterial pressure, but remains maximal throughout.

Variations of venous pressure on the right side of the heart influence in a marked manner the outflow from the left ventricle. As the general result of the experiments it was found that the outflow from the left ventricle, and consequently the work done by it, increases with the venous pressure, but not proportionally, up to the point of maximum work.

Variations in the rate of beat of the heart were obtained by heating or cooling the blood supplied to it. The general result may be stated as follows: A diminution of pulse-rate, brought about by lowering the temperature of the blood flowing into the heart, causes an increase in the quantity of blood thrown out from the ventricle at each systole, and consequently an increase in the work done at each systole, and *vice versa*. The changes in the outflow from the ventricle at each systole are not, however, inversely proportional to the changes in the pulse-rate. The total outflow, and, therefore, the total work done during any given period of time, decreases with a diminished pulse-rate, and increases with an increased pulse-rate.—*Johns Hopkins Univ. Circ., November, 1883.*

PSYCHOLOGY.

INTELLIGENCE IN A POINTER.—Don was a pointer dog, of large experience, that I shot with over forty years ago. At that time the pinnated grouse were abundant in our wild prairies. The birds were more frequently found in particular localities in different parts of the day. They affected the low grounds or swales, where the grass was long, in the heat of the day, and in the morning and evening they resorted to the high, rolling prairie. In a cool, cloudy day they were likely to remain on the high grounds. Don had learned this as well as his master, and when taken into the field it was interesting to observe the dog, when on the prairie, deliberately surveying the ground and then start out and range over the same ground his master would have selected.

This was the result of education and observation, and was not peculiar to Don. I have known many old bird dogs do the same.